JFSP Project Highlights

Research Supporting Sound Decisions

February 2005

Can Wildland Fire Use Restore Natural Fire Regimes in Wilderness and Other Unroaded Lands?

The JFSP, a partnership of six federal wildland fire and research organizations, provides scientific information and support for fuel and fire management programs.

JFSP Contacts

Erik Berg
Program Manager
208-387-5349

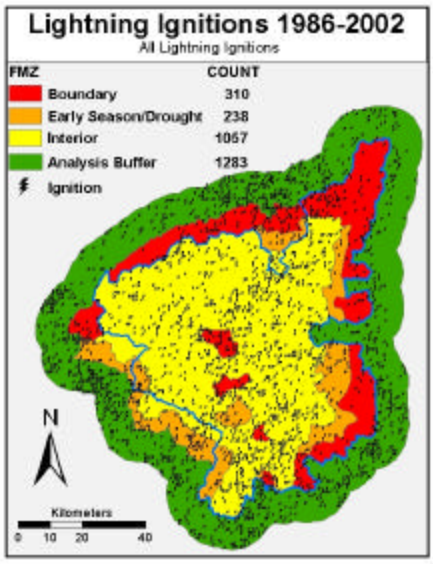
Becky Jenison
Program Assistant
208-387-5958

Tom Wordell
Fire Technology Transfer Specialist
208-387-5865

jfsp.nifc.gov

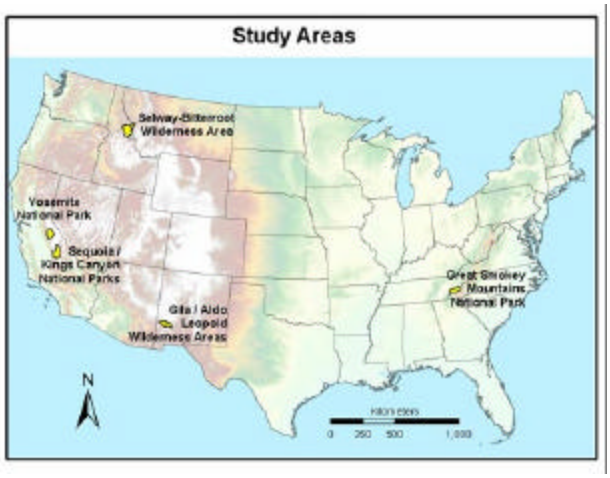
Background

Fire is a contagious process that responds to a multivariate landscape and does not obey administrative boundaries. As such, effective fire management planning needs to account for the spatial context and configuration of landscape variables, and it needs to do so across administrative boundaries.



The goal of this project was to develop an approach to assess the feasibility of Wildland Fire Use (WFU) as a strategy for managing fuels and restoring historical fire regimes in wilderness and other unroaded lands. This project developed methods to evaluate cross-boundary effects of fire suppression that account for unique landscape spatial configuration of fuels, topography and ignitions. To achieve this, the project team utilized a GIS model called BurnPro to estimate the annual probability of burning and help with other aspects of the feasibility analysis. Methods were used to evaluate how suppression of lightning-caused ignitions that occur *outside* WFU zones might affect the ability to achieve the restoration of fire *inside* the WFU zones (see map for Selway-Bitterroot). Specifically, the project examined how removing ignitions starting outside the WFU zone boundary would affect the predicted rate of burning within the WFU zone. The approach was applied on multiple study areas having very different precipitation regimes, demonstrating the information can be utilized over a variety of areas having different summer precipitation, season length or topographic patterns.

Site Selection

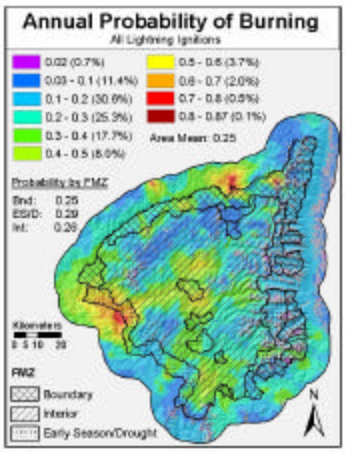


The most important factor that determined selection of study areas was the availability of fuels and fire data. Five high quality study areas met the project's criteria: the Gila/Aldo Leopold Wilderness, Great Smoky Mountains National Park, Selway-Bitterroot Wilderness, Sequoia-Kings Canyon National Parks, and Yosemite National Park (see map). All five study areas had existing Fire Management Plans with designated WFU zones.

Results

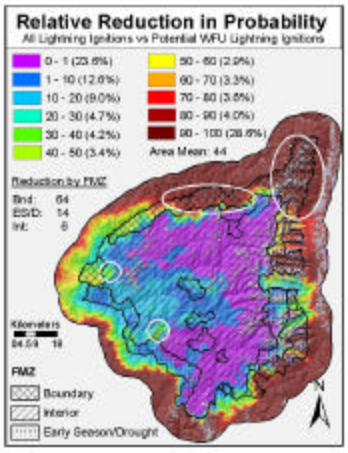
The primary analysis consisted of running BurnPro for two different ignition cases ("natural" and "current Fire Management Plan") and comparing the difference between the two model runs. Area averages for the two cases were compared and absolute and relative differences were calculated on a pixel-by-pixel basis. Areas with large differences between the two cases indicated places on the landscape that are more heavily influenced by the elimination of "immigration fires." Information and data included annual precipitation and temperature patterns, frequency of fire stopping events, and comparison of study areas by annual probability

of burning. In addition, a wide variety of spatial data and images were generated including;



- Length of fire season by elevation
- Average Annual Probability and Relative Reduction in Probability of burning between ignition scenarios (see example images for Selway-Bitterroot Area)
- Probability of burning overlaid with socio-economic or ecological values to identify risks and benefits
- Rate-of-spread for different fire weather conditions

Results provided useful information that can help managers evaluate where the current FMP is likely to meet their expectations or where it might fall short. For example, meeting restoration objectives with natural ignitions alone may be a challenge (due to suppression of ignitions on adjacent lands) in those areas that show large differences between "current FMP" and "natural" ignition cases. In some of the study areas, management staff requested the project team to modify the "current FMP" case to evaluate the effect of a potential revision to the FMP or account for realities that were not well represented in the FMP. This information will also be helpful during the go/no-go decision process by identifying where WFU opportunities are likely to be common or rare.



Conclusions

Although the project was unable to directly compare the estimates of probability of burning to historical fire frequencies, it did identify specific places in each study area where restoration of natural fire frequency may be difficult because of the important influence of "immigration fires". Because fires do not necessarily stop at administrative boundaries, neither do the impacts of suppression. This project showed that this effect is not uniform along a boundary or across the landscape, but varies according to the spatial configuration of fuels, topography, and ignitions. This knowledge can help inform the go/no-go decision by identifying high priority areas for WFU. If WFU is not possible, these are places where management-ignited prescribed fires might be warranted to achieve restoration objectives.

Principal Investigators:

- Carol Miller, Research Fire Ecologist, Aldo Leopold Wilderness Research Institute
- David Parsons, Director, Aldo Leopold Wilderness Research Institute

You can obtain further information at: http://leopold.wilderness.net/research/fprojects/F002.htm

A guidebook describing the methods and analyses used is available at: http://jfsp.nifc.gov/documents/Modeling_Procedure_Guidebook.pdf

Download a printable version of this JFSP Project Highlight at http://jfsp.nifc.gov/news/doc/highlight.pdf

Download previous JFSP Project Highlights at http://jfsp/nifc.gov/news/archives.htm